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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/616,022	07/09/2003	John Robert Beattie	PD-02-0719	1116

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EXAMINER

KIM, TAE JUN

ART UNIT PAPER NUMBER

3746

DATE MAILED: 01/12/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/616,022

Applicant(s)

BEATTIE ET AL.

Examiner

Ted Kim

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-26 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-4 and 14-18 is/are rejected.
- 7) ☒ Claim(s) 5-13 and 19-26 is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on ____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. ____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date 03/22/2004.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. ____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: ____.

DETAILED ACTION

Information Disclosure Statement

1. The information disclosure statement filed 03/22/2004 fails to comply with the provisions of 37 CFR 1.97, 1.98 and MPEP § 609 because the citation of the Shimada et al reference is incomplete, only the cover sheet and 2 additional pages were submitted. A telephone call to Anthony Oerler of Gates and Cooper was placed on 1/5/05 to try to obtain a complete copy but as of this office action, no full citation was submitted. The article has been placed in the application file, but the information referred to therein has not been considered as to the merits. Applicant that the date of any re-submission of any item of information contained in this information disclosure statement or the submission of any missing element(s) will be the date of submission for purposes of determining compliance with the requirements based on the time of filing the statement, including all certification requirements for statements under 37 CFR 1.97(e). See MPEP § 609 ¶ C(1).

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

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3. Claims 1-4, 14-18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Beattie et al (5,947,421) in view of Meyer et al (6,518,693) and Beattie et al (4,733,530). Beattie et al '421 teach an apparatus for driving a plurality of ion thrusters comprising: at least one power supply 36 (Fig. 1) or 188 (Fig. 3) and a Zener diode 101 coupling the power supply to ground. Beattie et al do not teach each voltage-regulated power supply for driving a common element in each of the plurality of ion thrusters nor a current balance circuit for providing a substantially balanced current to each neutralizer cathode of the plurality of ion thrusters. Meyer et al teach integrating a power supply, i.e. 300 the anode power supply to drive a common element in each of the plurality of ion thrusters, the common element in each of the plurality of ion thrusters being coupled together at a common point (see abstract, and e.g. col. 6, lines 25-29). As for providing a voltage-regulated power supply, Meyer et al teach that the power supply choice is a matter of design choice (col. 6, lines 19+) and there are two main categories of power supplies, of which regulated-regulated is one. It would have been obvious to one of ordinary skill in the art to drive a common element in each of the thrusters, in order to reduce component count and/or weight and to make it a voltage-regulated power supply in order as a well known type of power supply used in the art. Beattie et al '530 and a current balance circuit for providing a substantially balanced current to each neutralizer cathode 44, 46 of the plurality of ion thrusters by providing a voltage to the neutralizer cathodes relative to the common point (ground). It would have been obvious to one of ordinary skill in the art to employ a current balancing scheme, in order to insure proper balancing of the thrust

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from each thruster. As for the at least one voltage-regulated power supplying comprising the screen power supply and accelerator power supply, it would have been obvious to one of ordinary skill in the art to select these power supplies to integrate between the plurality of ion thrusters as Meyer et al teach it is old and well known to integrate the power supply and/or control circuitry (e.g. col. 6, lines 25-29) of different thrusters. As for providing a current-regulated power supply, Meyer et al teach that the power supply choice is a matter of design choice (col. 6, lines 19+) and there are two main categories of power supplies, of which current-regulated is one. It would have been obvious to one of ordinary skill in the art to employ a current regulated power supply to regulate the current to elements in the thrusters.

Allowable Subject Matter

4. Claims 5-13, 19-26 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Contact Information

Any inquiry concerning this communication or earlier communications from the Examiner should be directed to Ted Kim whose telephone number is 571-272-4829. The Examiner can be reached on regular business hours before 5:00 pm, Monday to Thursday and every other Friday.


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The fax numbers for the organization where this application is assigned are

703-872-9306 for Regular faxes and 703-872-9306 for After Final faxes.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Cheryl Tyler, can be reached on 571-272-4834.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist of Technology Center 3700, whose telephone number is 703-308-0861. General inquiries can also be directed to the Patents Assistance Center whose telephone number is 800-786-9199. Furthermore, a variety of online resources are available at <http://www.uspto.gov/main/patents.htm>



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